



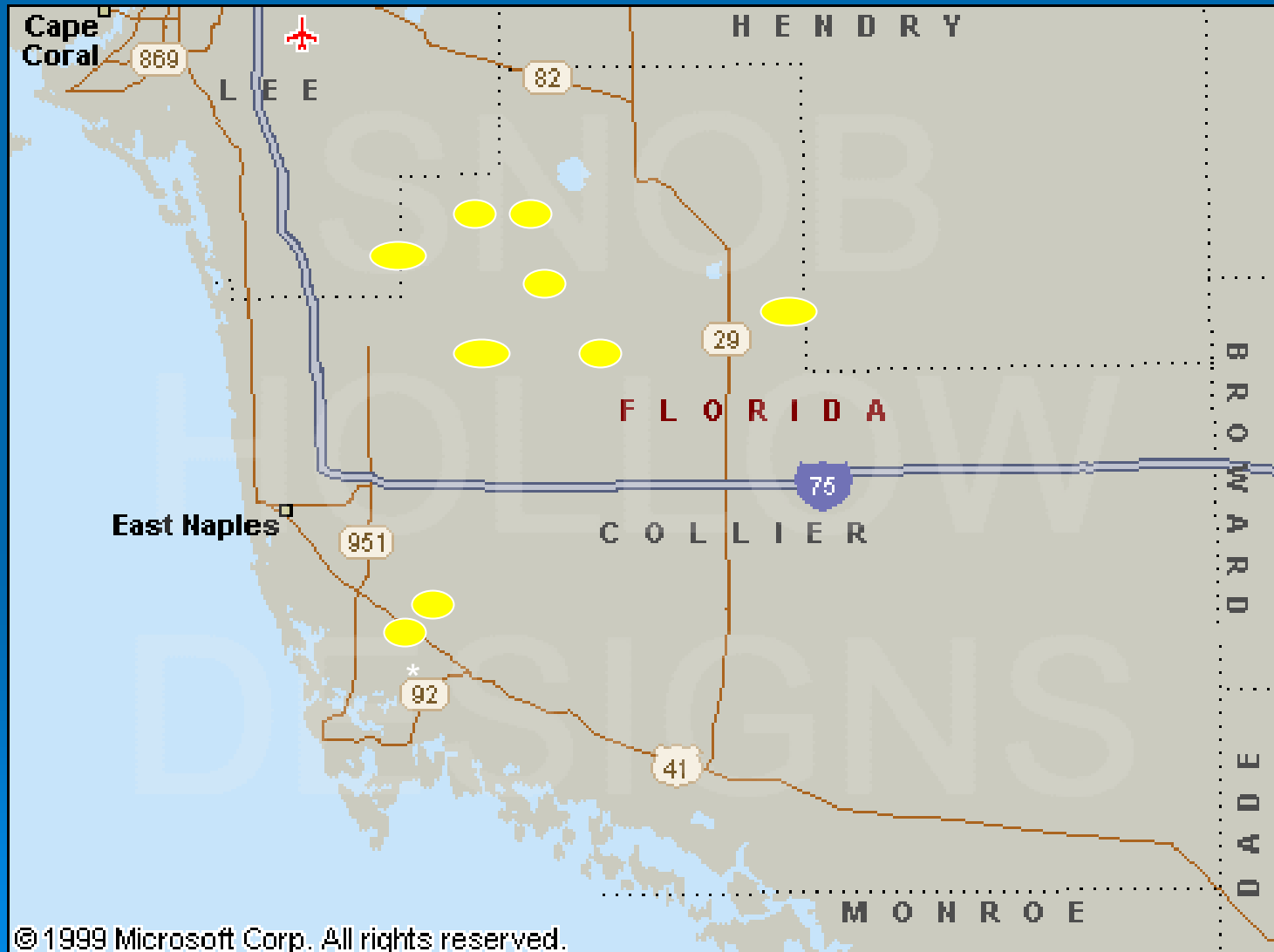
**UF-IFAS Nitrogen Fertilization and
Management Recommendations for Fresh Tomato
Production in Florida in the BMP Era**

**Monica Ozores-Hampton, Eric Simonne, Eugene McAvoy,
Phil Stansly, Sanjay Shukla, Pam Roberts, Fritz Roka,
Kent Cushman, Morgan Kelly, Darrin Parmenter, Phyllis
Gilreath and Tom Obreza.**

Objectives

- Establish partnerships with selected southwest Florida vegetable growers to evaluate the effects of N nutrient applications under commercial growing conditions;
- Evaluate the effect of selected N application rates on plant growth, disease incidences, and production;
- Determine the optimal N rate for tomato production and evaluate the cost effectiveness of selected N application rates;
 - Propose, if needed, a change in N recommendation to PNOG
- Develop an Extension plan to demonstrate the updated N recommended rate and facilitate the adoption of nutrient BMPs by the industry.

Experiment Locations



Experiment Locations



*

Nitrogen Rates

Trial number	Farm	Season	Irrigation type	N rate (lb/acre) ^z	Plot size (acres)
2005-06					
1	1	Fall Sep 19	Seepage	200 to 275 200+C	0.17 (CRD)
2	2	Fall Sept 15	Seepage	200 and 260	5 (CRD)
3	5	Fall Oct 5	Drip	200 and 300	17
4	2	Winter Nov 17	Seepage	200 and 260	3 (CRD)
4	5	Winter Nov 14	Drip	200 and 300	25
6	5	Winter Nov 18	Seepage	200 and 330	1.5 (CRD)
7	3	Spring Jan 4	Seepage	200 and 320	0.83 (CRD)
8	4	Spring Feb 22	Seepage	20 to 420	20' (CRD)
9	2	Spring Feb 17	Seepage	200 and 260	3 (CRD)

Seepage Experiments







2-12 plots per treatment with 3 reps
10 plants per plot



Sap Nitrate- NO_3^- - K



Wells-Water Tables



Suction Lysimeter



**Soil Sampling
NO₃-P-K**

**At hot band
and center of
the bed**

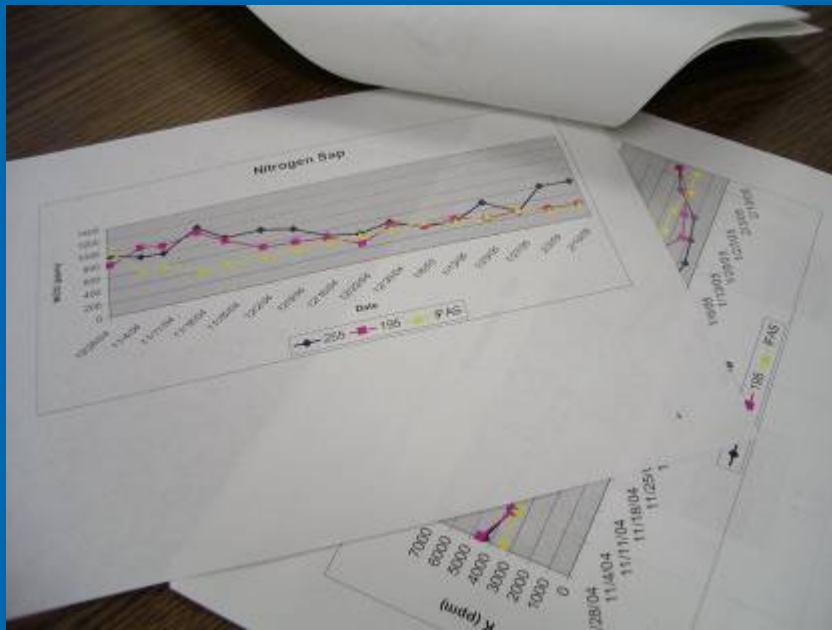


Moisture

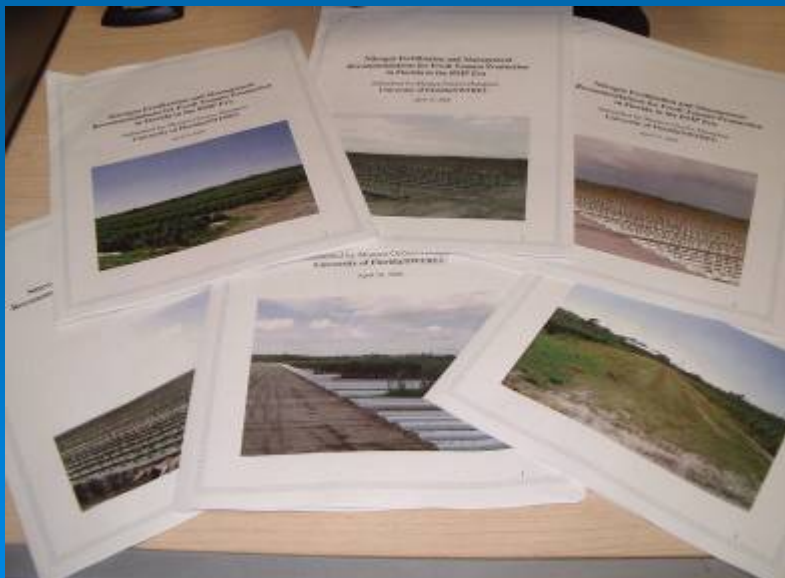
Data logger/PC-400

**Three Harvest
5/6, 6/6, 6/7 and culls**





By-weekly report to growers and IFAS



Final report to growers and IFAS

Fall Season

Aug - Oct 15



Field History

N Rates (lb/acre)	200 to 275 plus C
IFAS rate (top mix)	1,300 lb/a (12-0-26)
Irrigation	Seepage
Plot size	0.15 acre
Planting Date	19-Sep-05
Cell Size	242
Fumigation	Methyl Bromide
Linear ft per acre	7,260
Plant population	4,840
Bed Heigth	8 in
Plant Spacing	18 in
Row run	North - South
Monitoring Wells	12
Harvest Date	
1st	10-Jan-06
2nd	26-Jan-06
3rd	7-Feb-06

Farm # 1

Irrigation	Seepage
Plot size	5 acres
Planting Date	9/15/2005 (Fall)
Bed wide	32'
Fumigation	M.B 150/acre (98:2)
Linear ft per acre	7,260
Plant population	4,373
Bed Heigth	8 in
Plant Spacing	20 in
Row run	North to South
Monitoring Wells	6
Planting-3er Harvest	18.5 weeks
1st	15-Dec-05
2nd	5-Jan-06
3rd	19-Jan-06
4th	2-Feb-06

Farm # 2

Irrigation	Drip
Plot size (acres)	17
Plant Date	10/5/2005 (Fall)
Linear ft per acre	7,260
Fumigation	M.B
Plant polpulation	4,356
Bed Heigth	8 in
Plant Spacing	24 in
Row run	North to South
Monitoring Wells	2
Planting to 3er Ha	19 weeks
1st	11-Jan-06
2nd	30-Jan-06
3rd	15-Feb-06

Farm # 5



Farm # 1
Seep
Irrigation
Fall, 2005



200 lb/N



Farm # 2
Seep
Irrigation
Fall, 2005



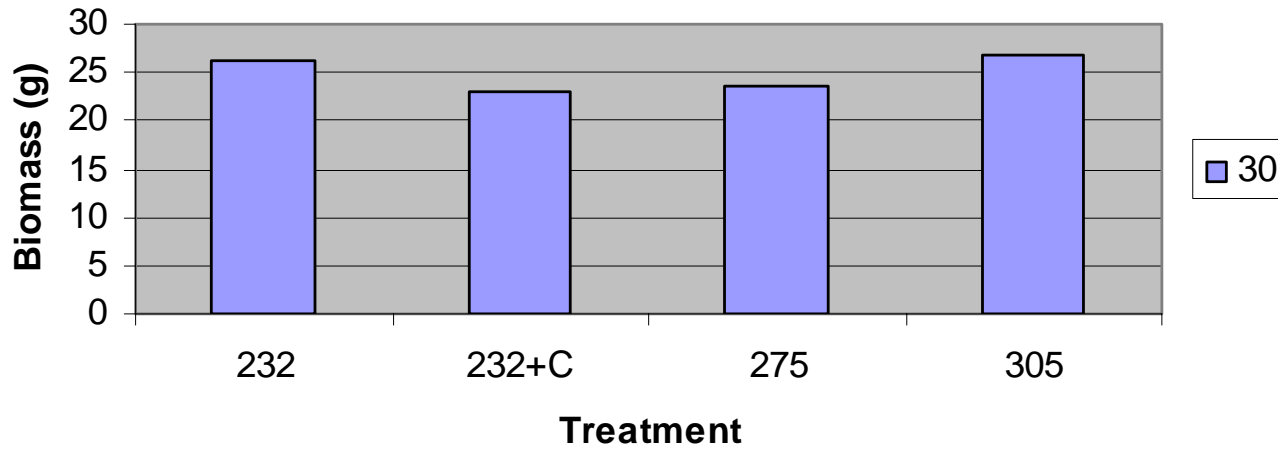
Farm # 5
Drip
Irrigation
Fall, 2005



Plant Biomass

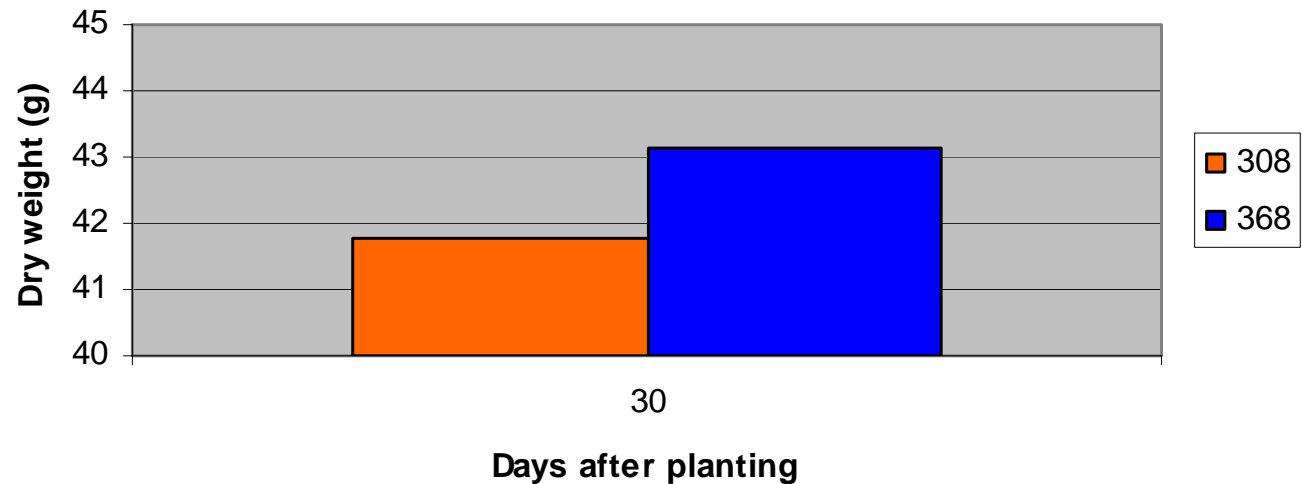
Plant Biomass (30 days after planting)

Farm # 1

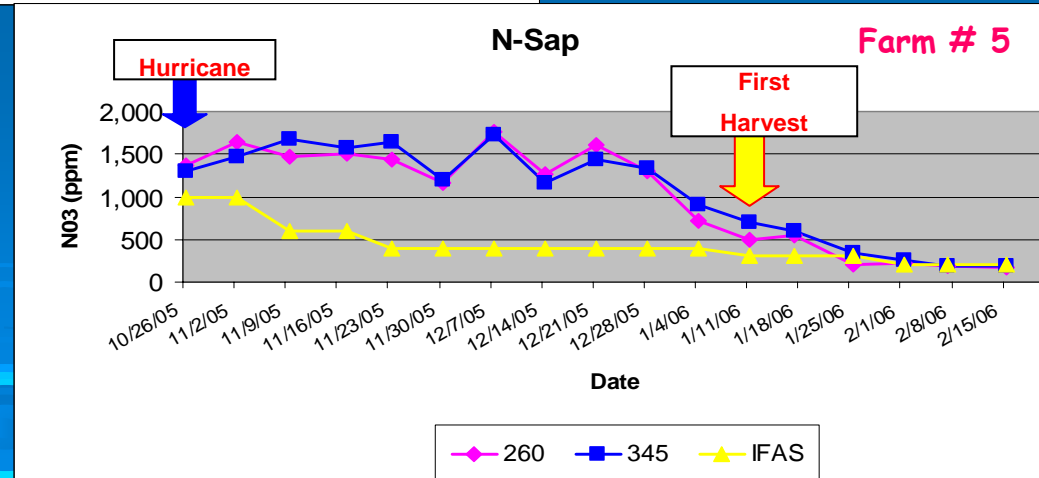
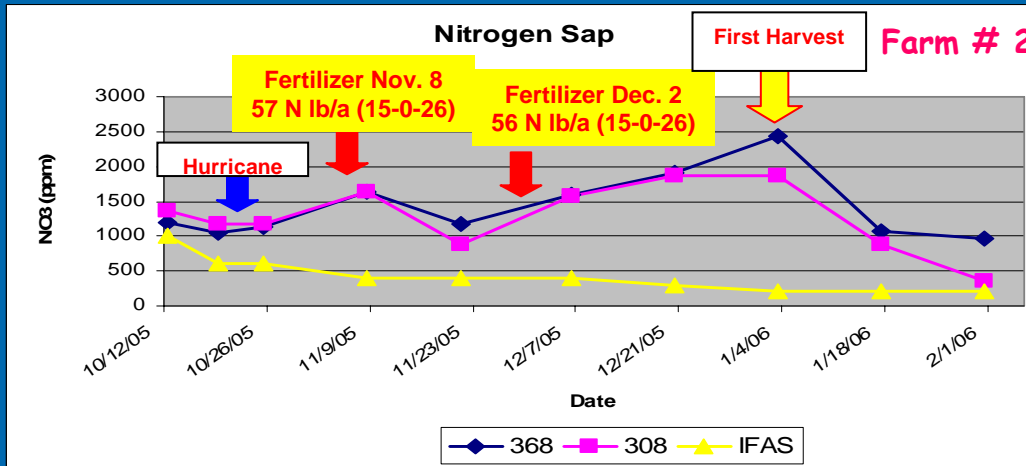
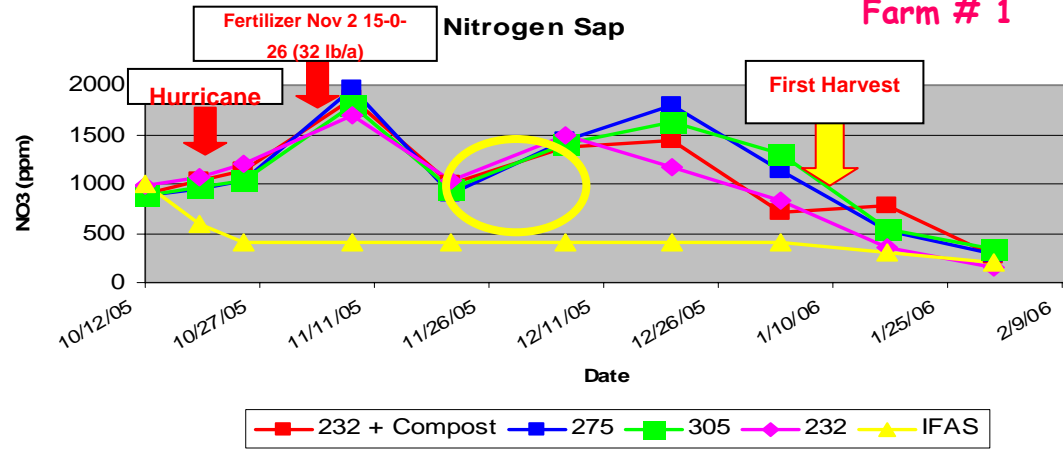


Tomato Biomass

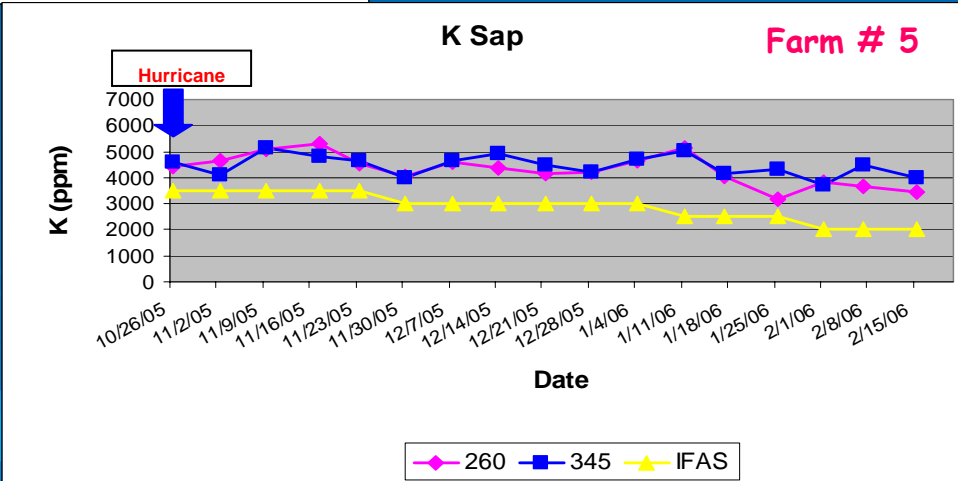
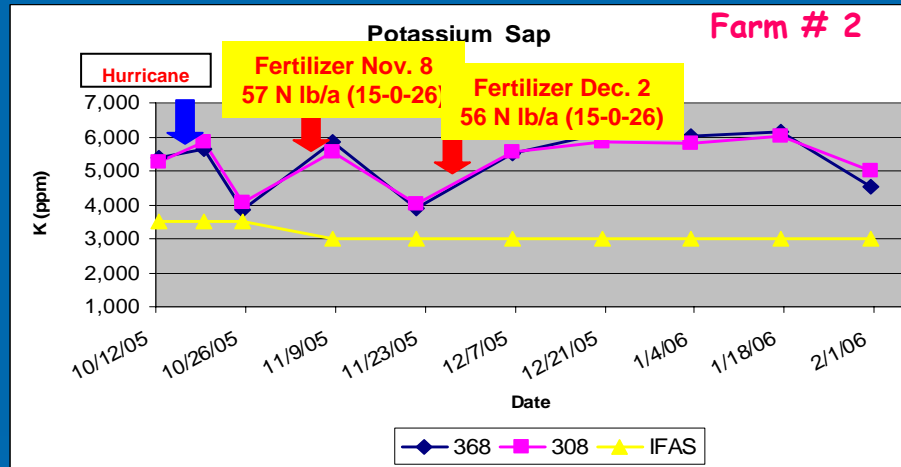
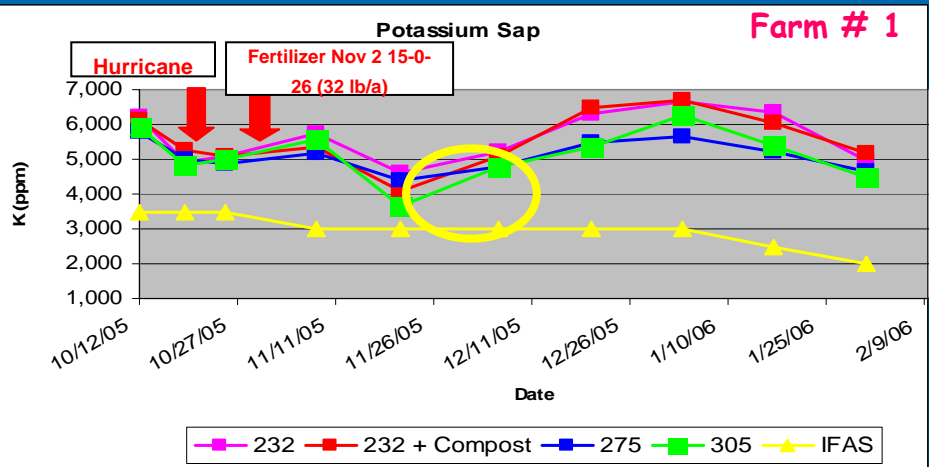
Farm # 2



Nitrogen SAP



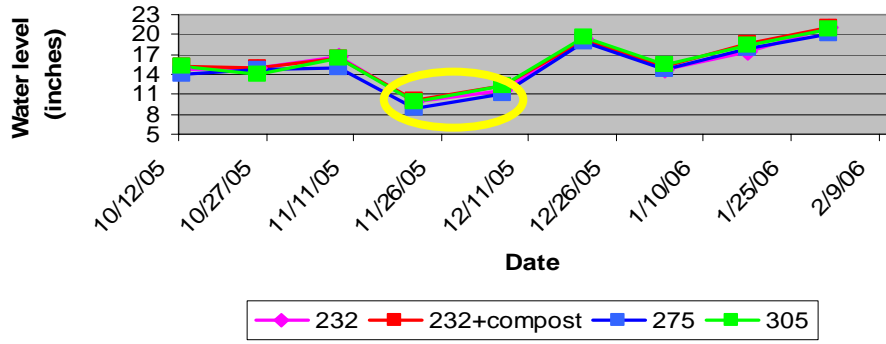
Potassium SAP



Water Tables

Water Tables

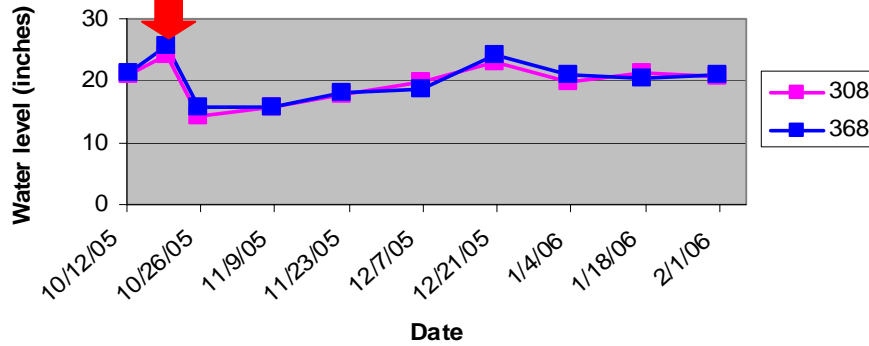
Farm # 1



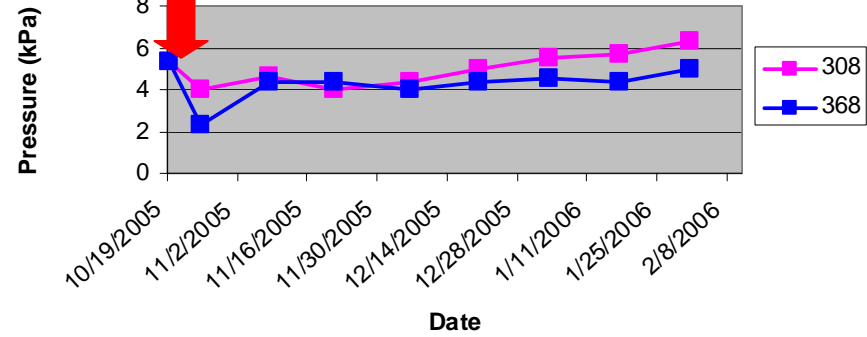
Hurricane

Water Tables

Farm # 2

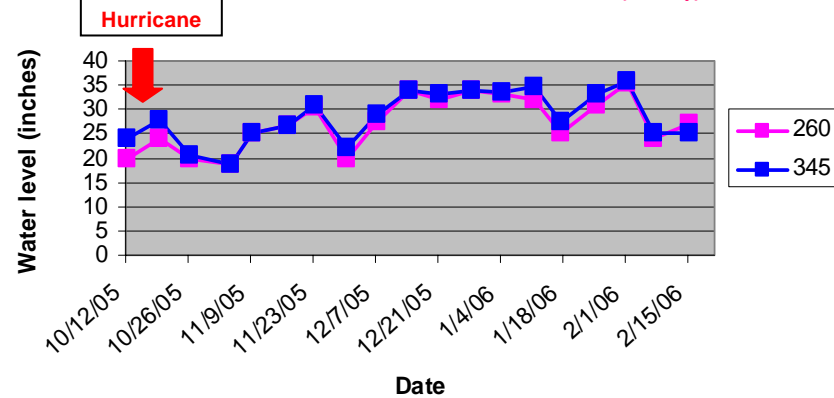


Tensimeter



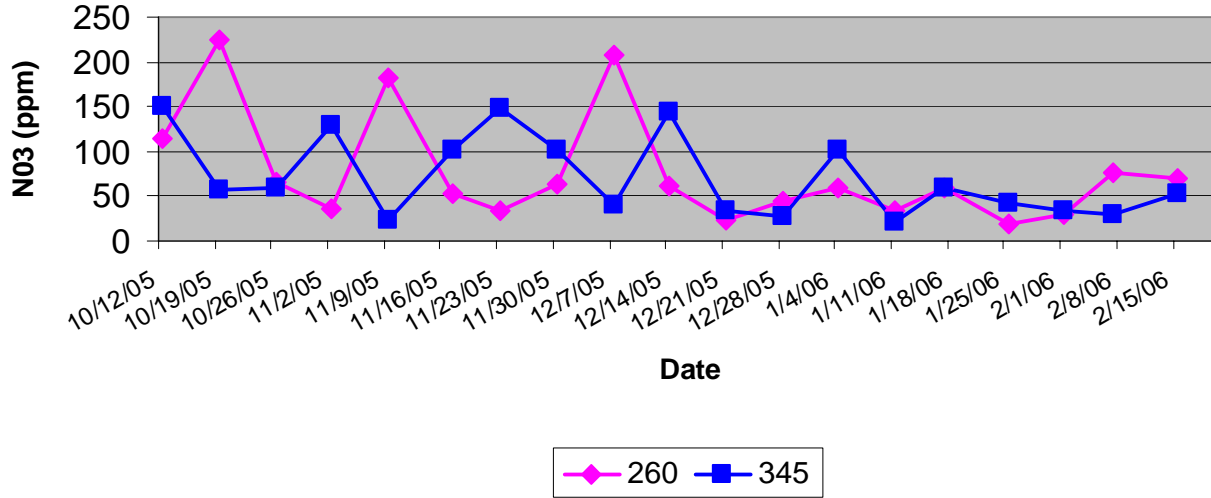
Water Tables

Farm # 5



Soil Solution-NO₃

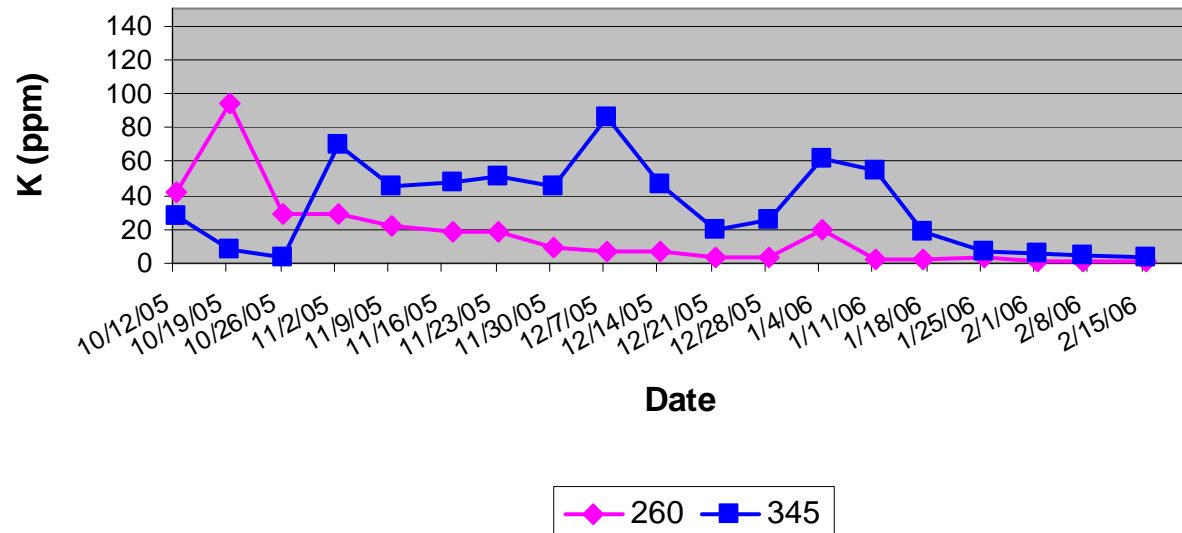
Farm # 5



Soil Solution

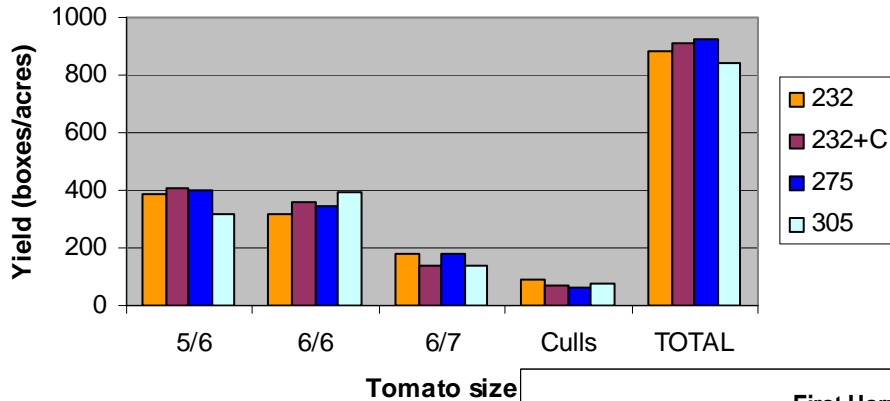
Soil Solution-K

Farm # 5

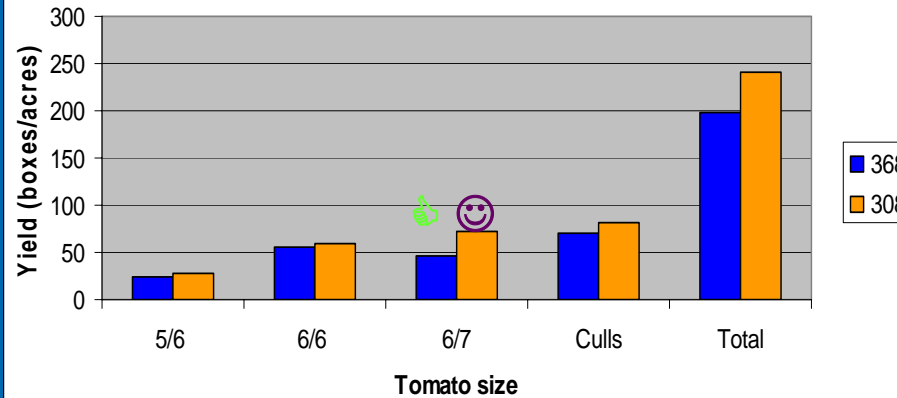


First Harvest

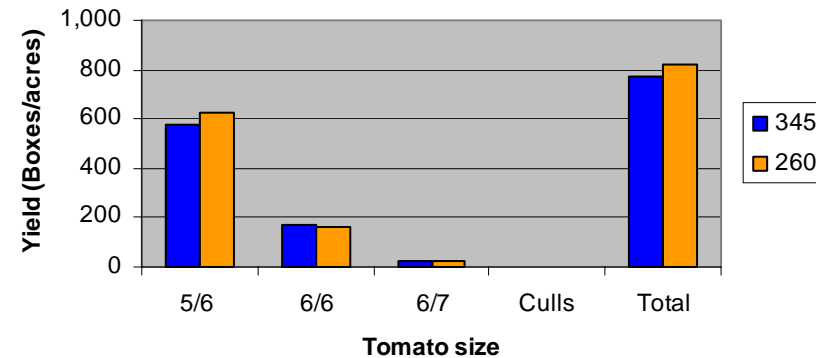
First Harvest (January 10, 2006) Farm # 1



First Harvest (December 15, 2005) Farm # 2



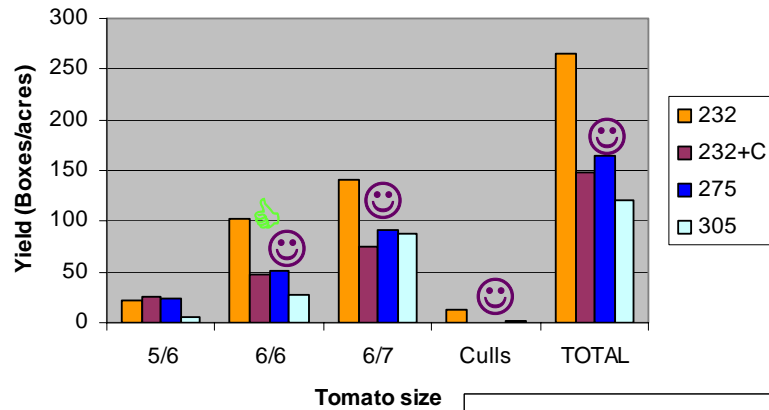
First Harvest (January 11, 2006) Farm # 5



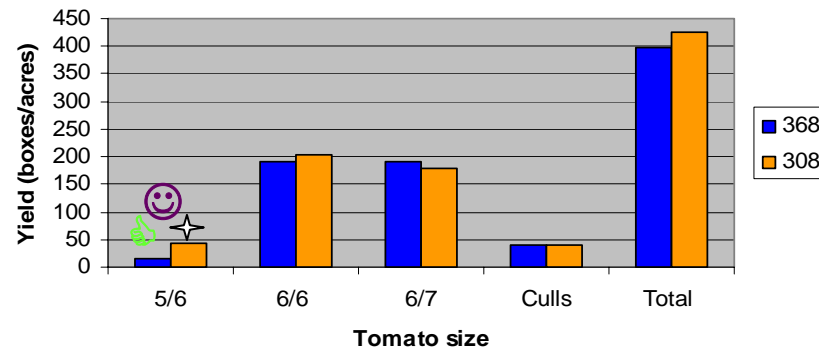
- ◆ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Third Harvest

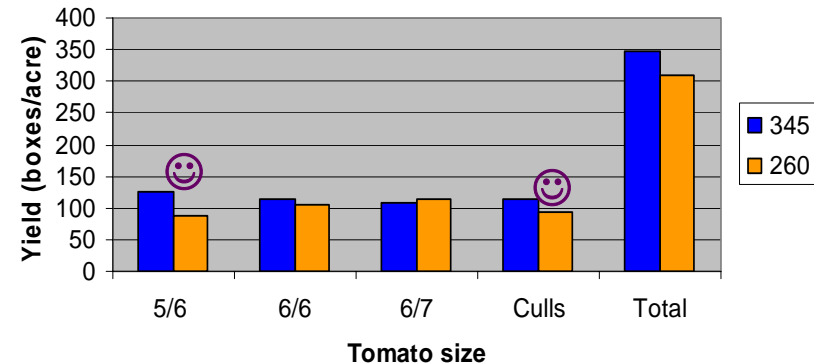
Third Harvest (February 7, 2006) Farm # 1



Third Harvest (January 19, 2006) Farm # 2



Third Harvest (February 15, 2006) Farm # 5

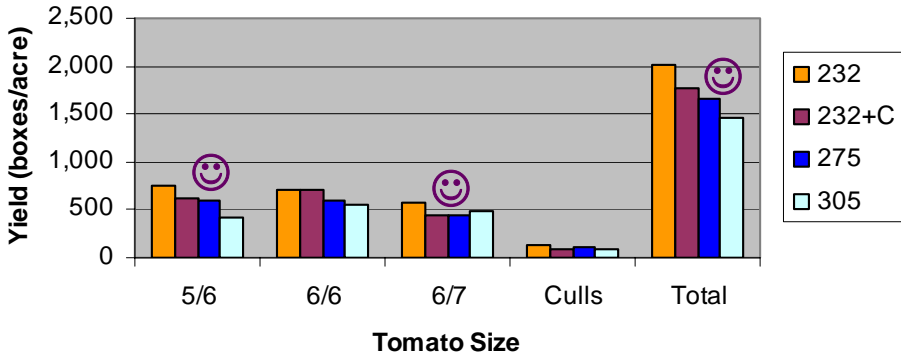


- ✦ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Total Harvest

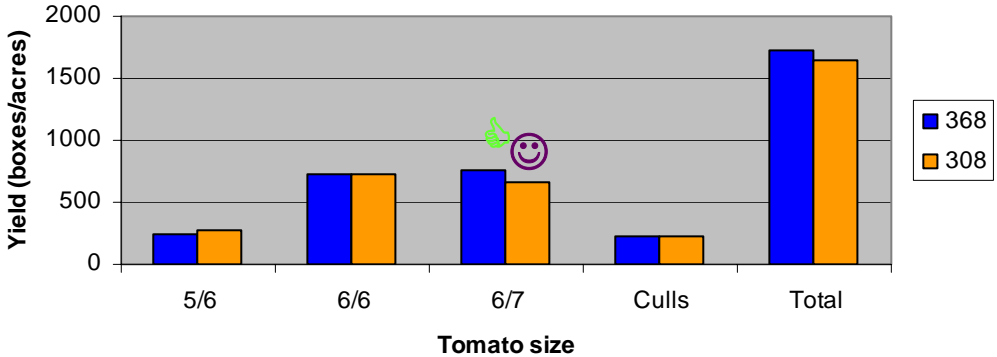
Total Harvest

Farm # 1



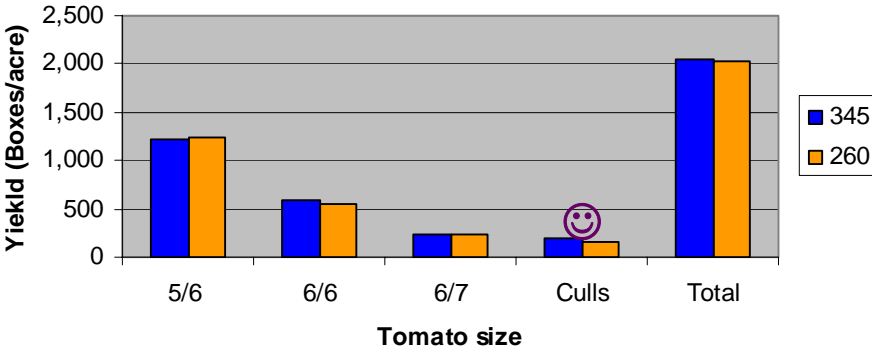
Total Harvest

Farm # 2



Total Harvest

Farm # 5

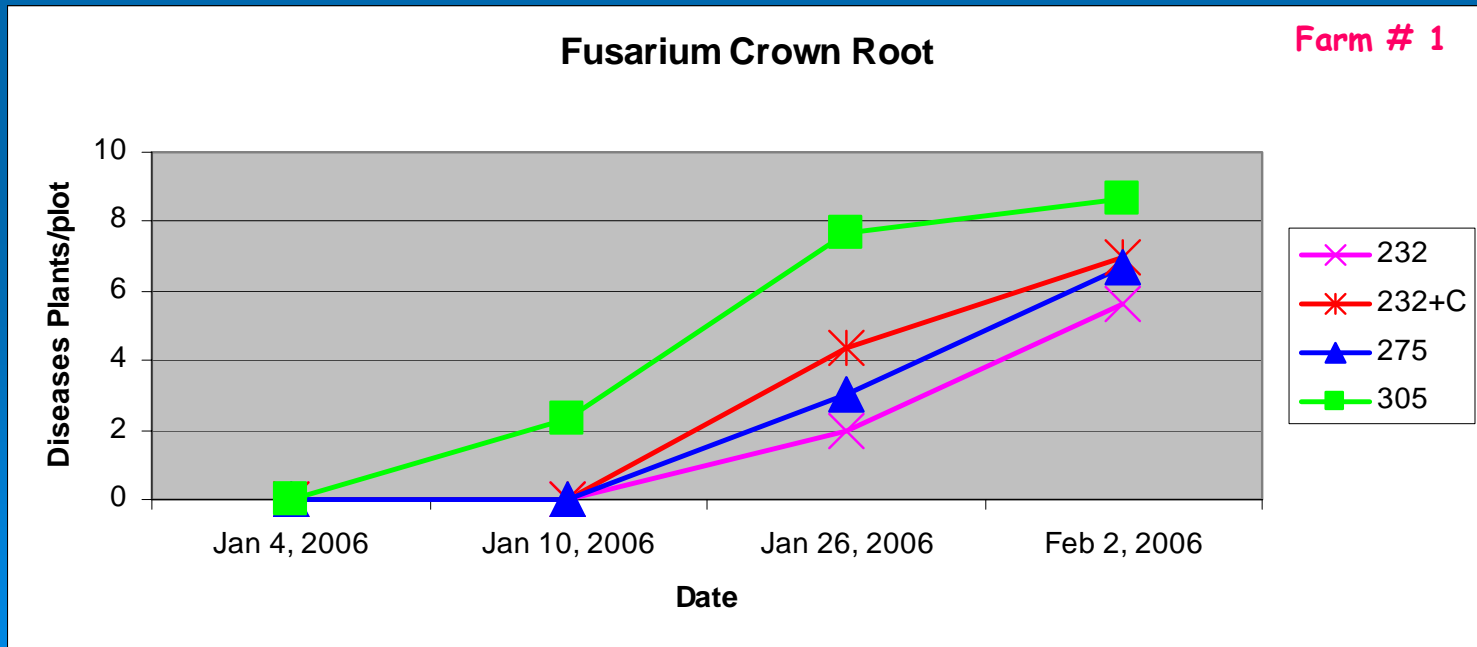


- ◆ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Farm # 1



Fusarium Crown Root



Winter Season

Oct 15 - Dec 1



Field History

N Rates (lb/acre)	200 & 260
IFAS rate (top mix)	1,500 lb/a (11-0-26)
Irrigation	Seepage
Plot size	5 acres
Planting Date	Nov/17/2006
Cell Size	200
Fumigation	M.B 150/acre (98:2)
Linear ft per acre	7,260
Bed Heigth	8 in
Plant Spacing	20 in
Row run	North to South
Monitoring Wells	6
Harvest Date	
	1st 2-Mar-06
	2nd 20-Mar-06
	3rd 3-Apr-06

Farm # 2

Irrigation	Drip
Plot size (acres)	16 (Grower)/15 (BMP)
Plant Date	14-Nov-05
Fumigation	M.B
Linear ft per acre	7,260
Plant polpulation	4,356
Bed Heigth	8 in
Plant Spacing	24 in
Row run	North to South
Monitoring Wells	2
Planting to 3er Ha	19 weeks
	1st Feb-28-2006
	2nd Mar-13-2006
	3rd Mar-27-2006

Farm # 5

Irrigation	Seepage
Plot size (acres)	1.5
Plant Date	18-Nov-05
Fumigation	M.B
Linear ft per acre	7,260
Plant polpulation	3,630
Bed Heigth	8 in
Plant Spacing	24 in
Row run	North to South
Monitoring Wells	2
Planting to 3er Harvest	19 weeks
	1st 3-Mar-06
	2nd 14-Mar-06
	3rd 28-Mar-06

Farm # 5

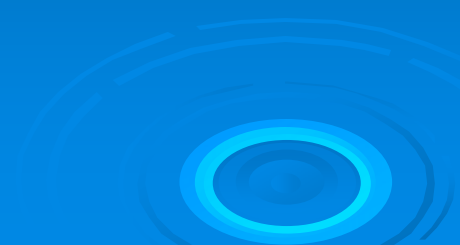
Farm # 2
Seepage Irrigation
Winter, 2005



Farm # 5
Drip Irrigation
Winter, 2005



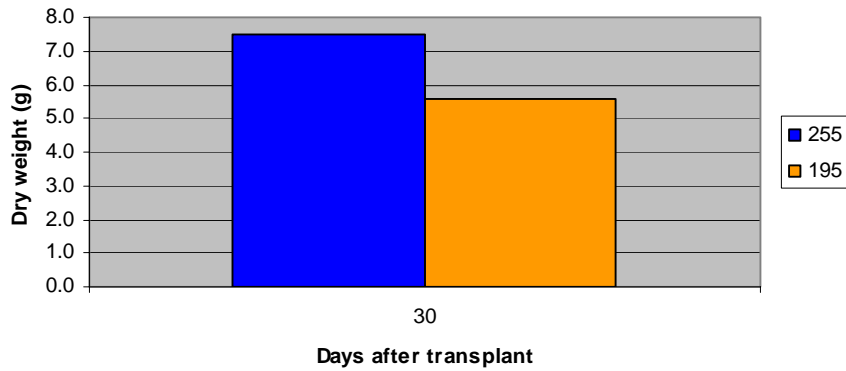
Farm # 5
Seepage Irrigation
Winter, 2005



Plant Biomass

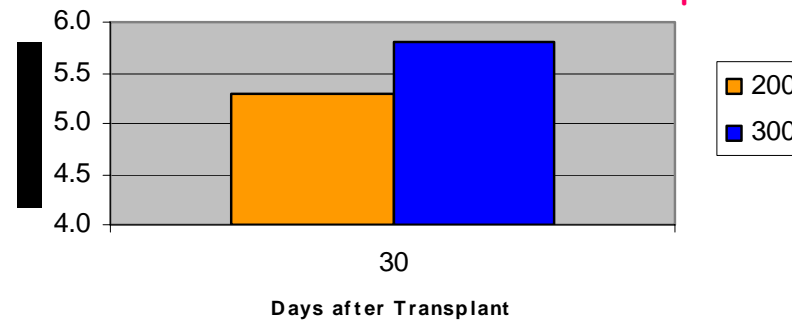
Tomato Biomass

Farm # 2
Seepage



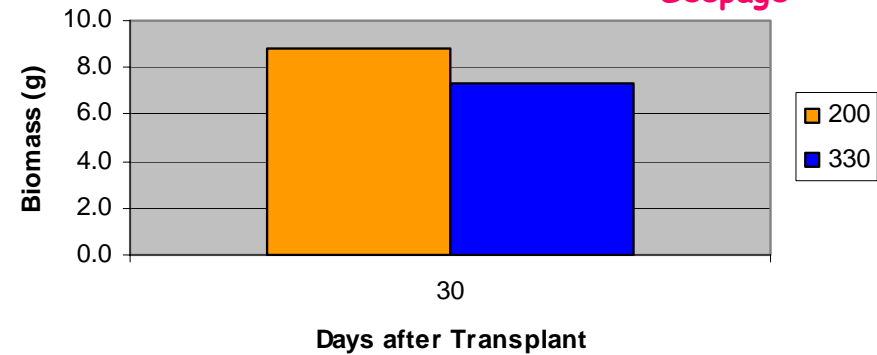
Tomato Biomass

Farm # 5
Drip



Plant Biomass

Farm # 5
Seepage





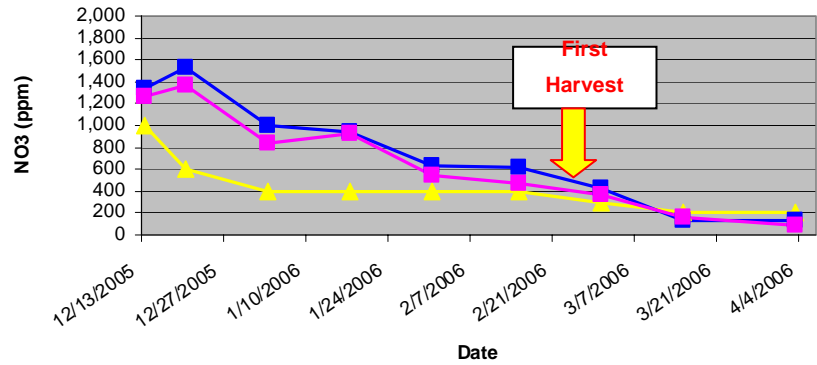
300 lb N/acre

200 lb N/acre

Nitrogen SAP

Nitrogen Sap

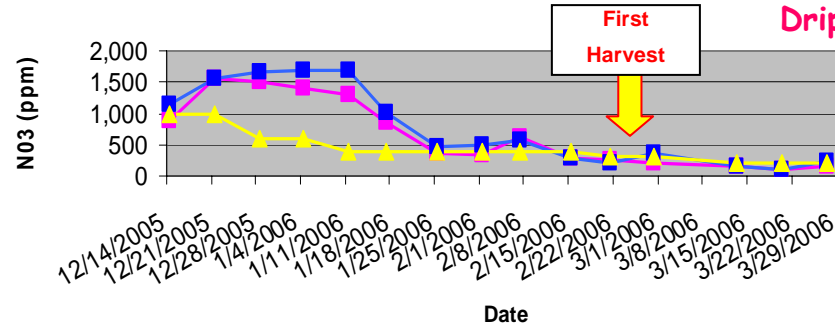
Farm # 2
Seepage



IFAS 260 200

N-Sap

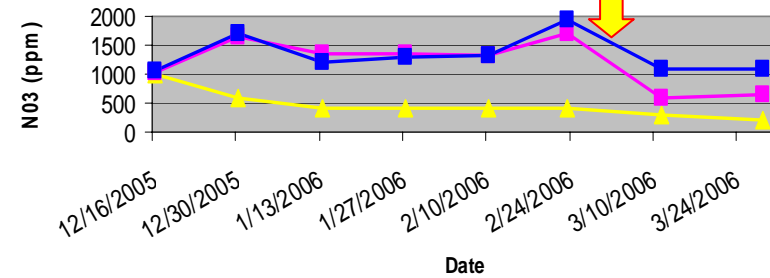
Farm # 5
Drip



200 300 IFAS

N-Sap

First
Harvest



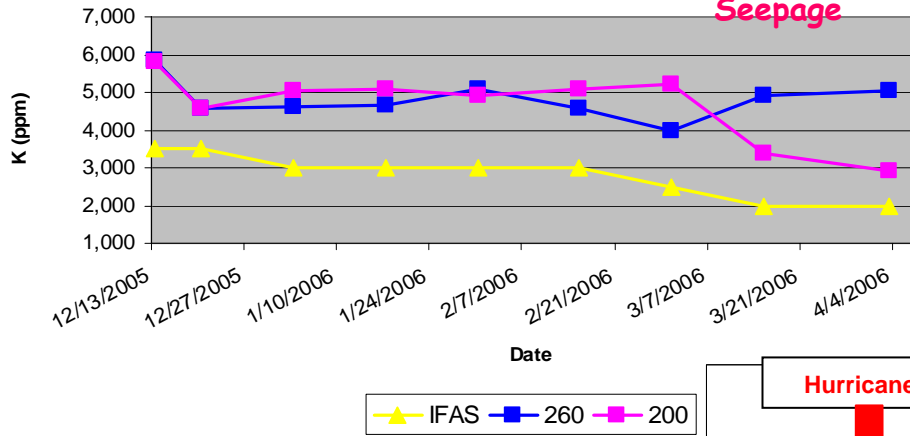
Farm # 5
Seepage

IFAS 200 330

Potassium SAP

Potassium Sap

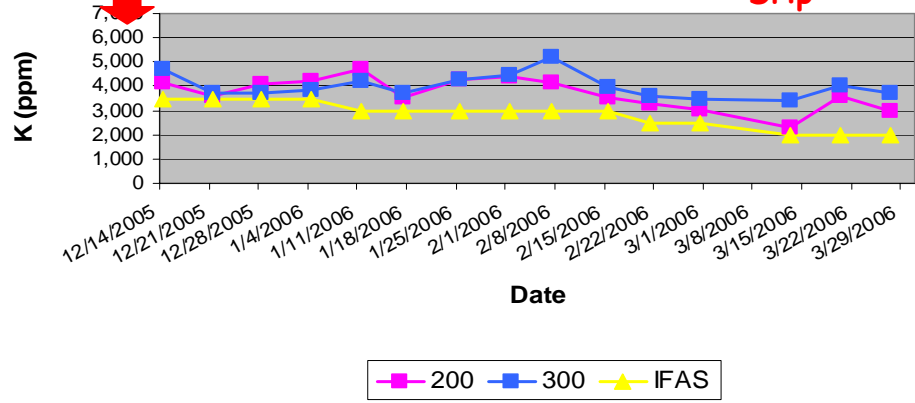
Farm # 2
Seepage



Hurricane

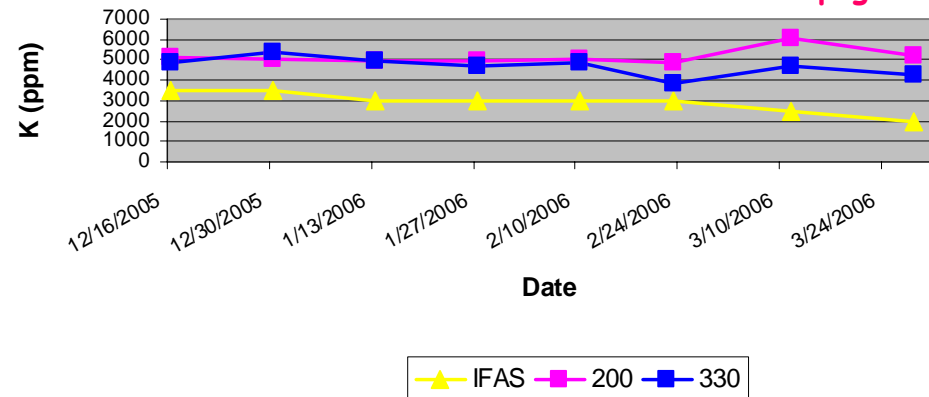
K Sap

Farm # 5
Drip

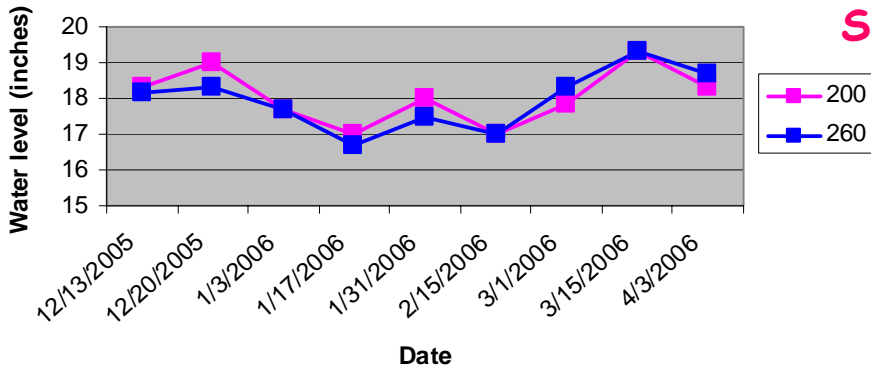


K Sap

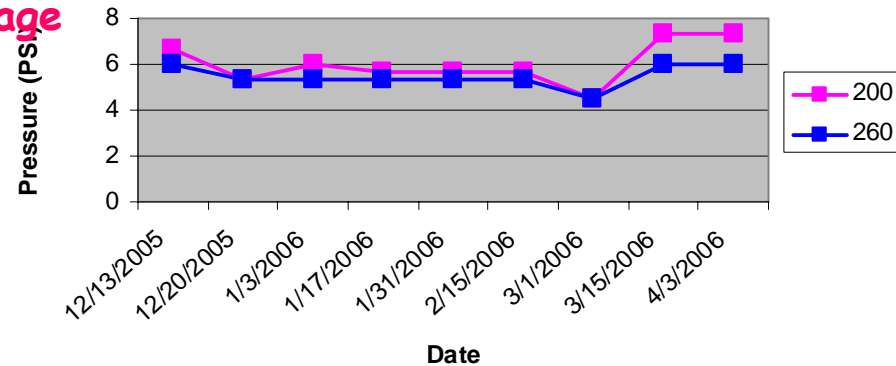
Farm # 5
Seepage



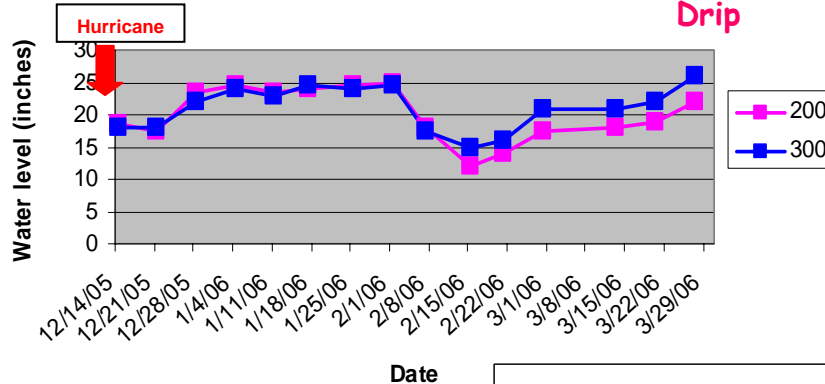
Water Tables



Tensimeter

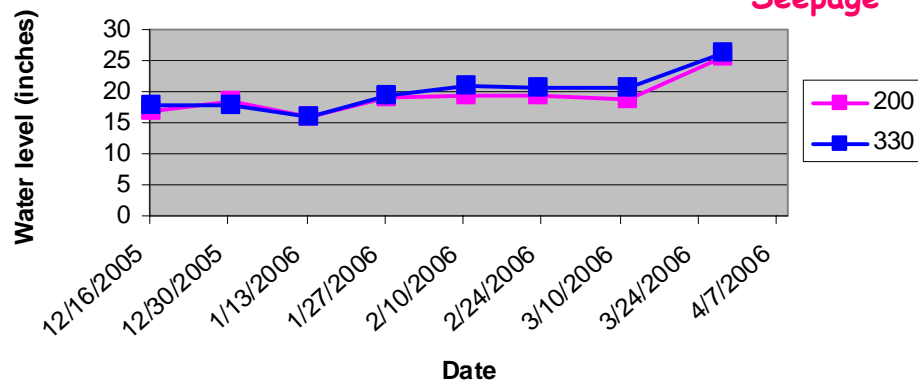


Water Tables



Farm # 5 Drip

Water Tables



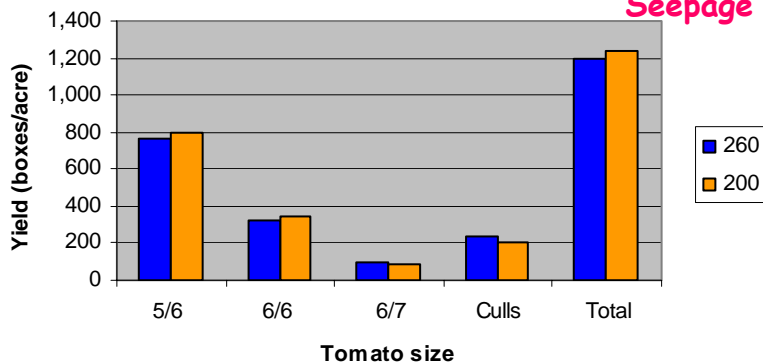
Farm # 5 Seepage

Water Tables

First Harvest

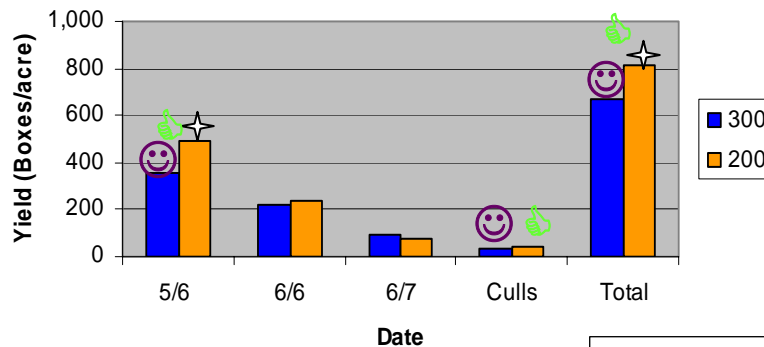
First Harvest (March 2, 2006)

Farm # 2
Seepage



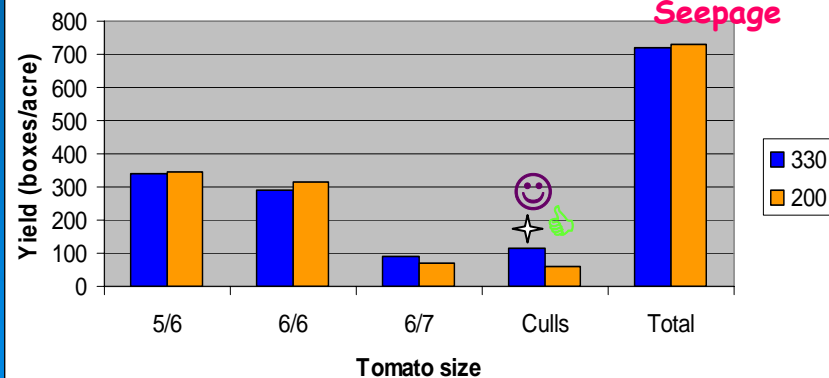
First Harvest (February 28, 2006)

Farm # 5
Drip



First Harvest (March 3, 2006)

Farm # 5
Seepage

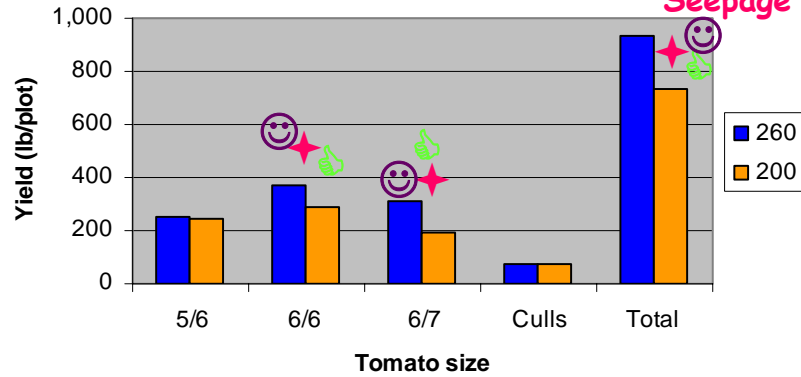


- ✦ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Third Harvest

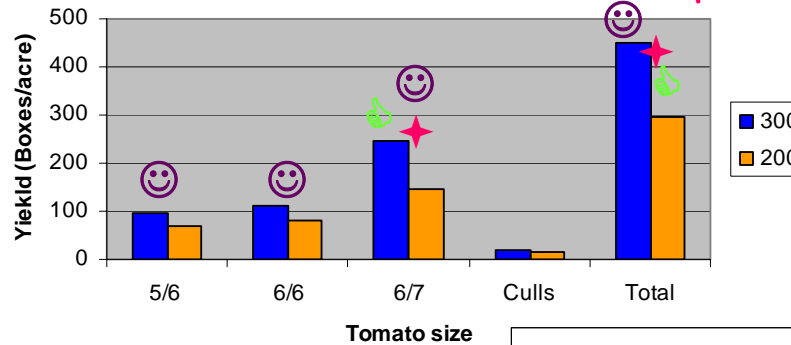
Third Harvest (April 3, 2006)

Farm # 2
Seepage



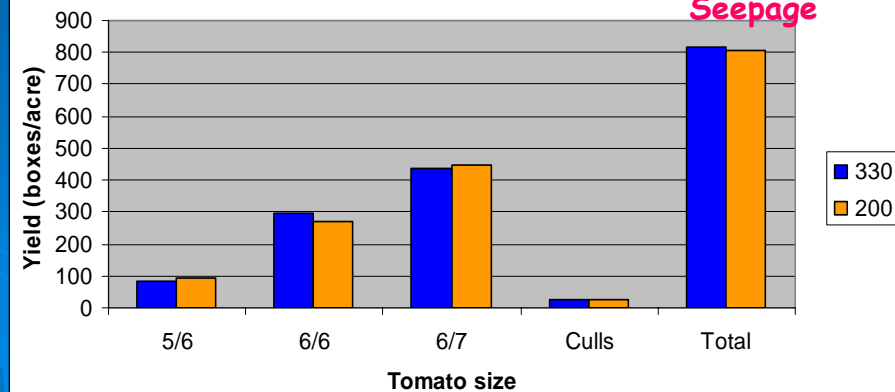
Third Harvest (March 27, 2006)

Farm # 5
Drip



Third Harvest (March 28, 2006)

Farm # 5
Seepage

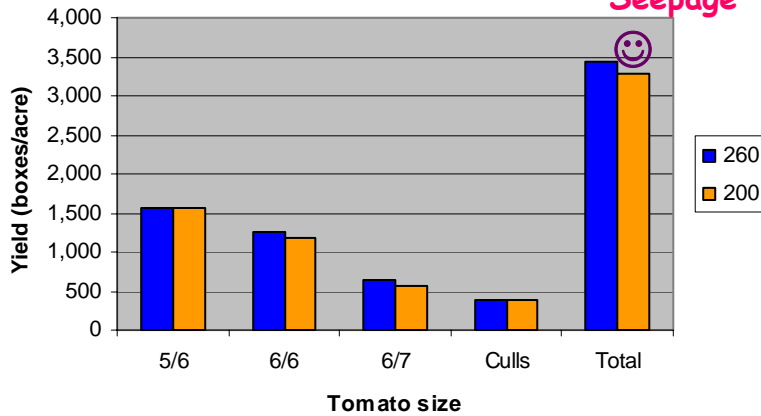


- ◆ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Total Harvest

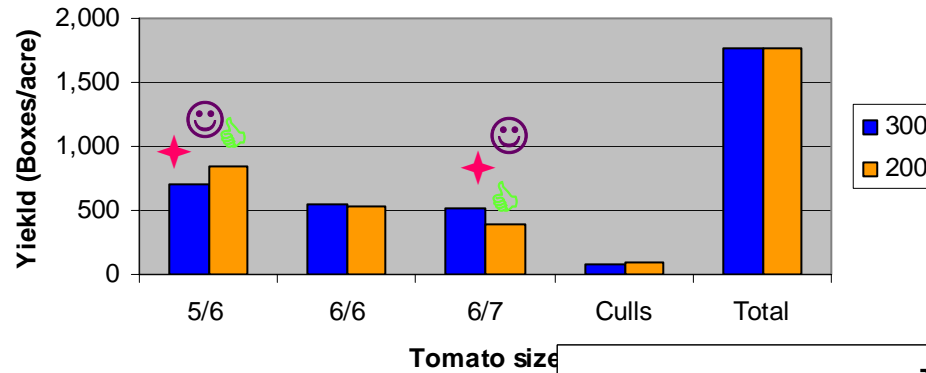
Total Harvest

Farm # 2
Seepage



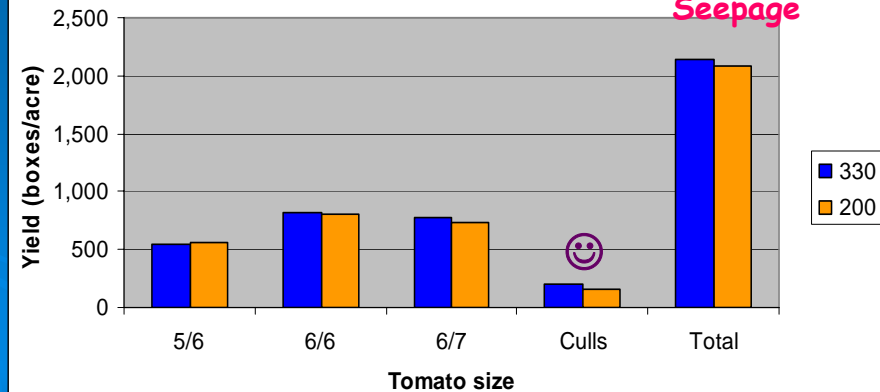
Total Harvest

Farm # 5
Drip



Total Harvest

Farm # 5
Seepage



- ★ 5% level of significance
- 👍 10% level of significance
- 😊 25% level of significance

Spring Season

Dec 1 - Feb 1



Farm # 3
Seepage Irrigation



Farm #4
Seepage Irrigation
20 to 420 lb/acre

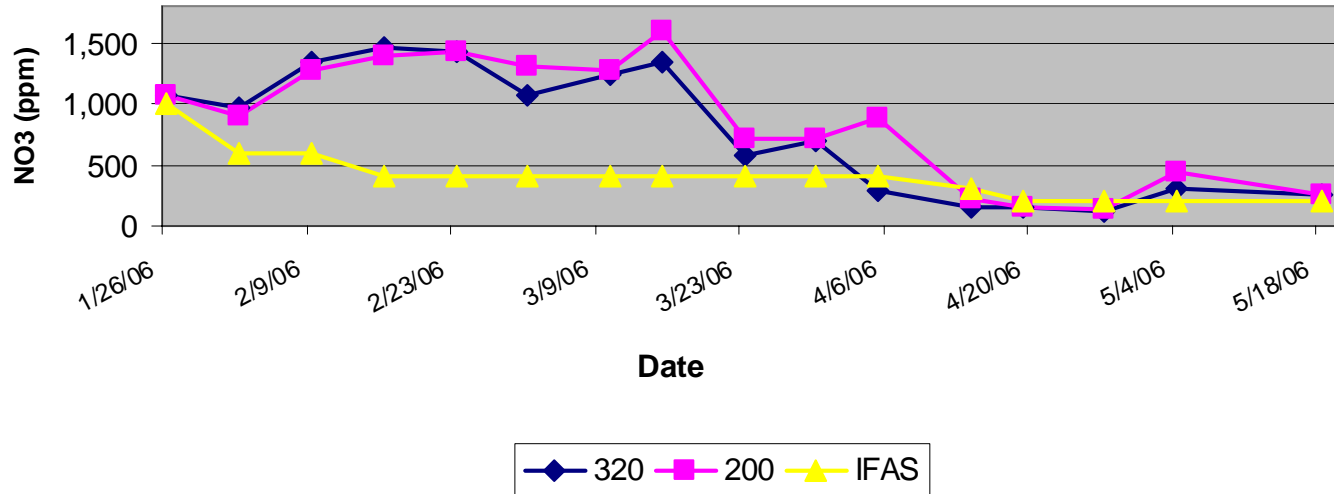


Farm #2
Seepage Irrigation



Nitrogen Sap

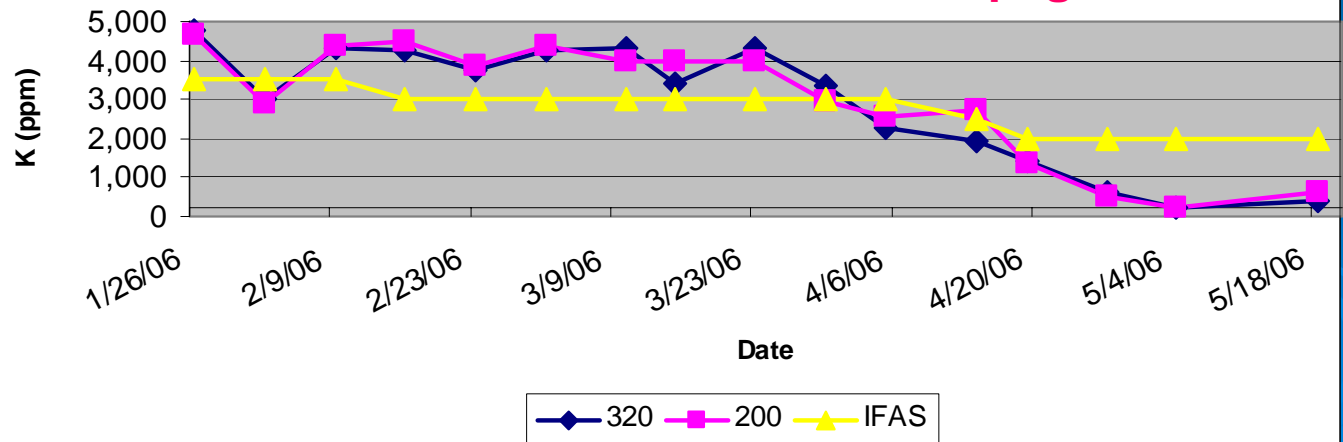
**Farm # 3
Seepage**



**Sap
Testing**

Potassium Sap

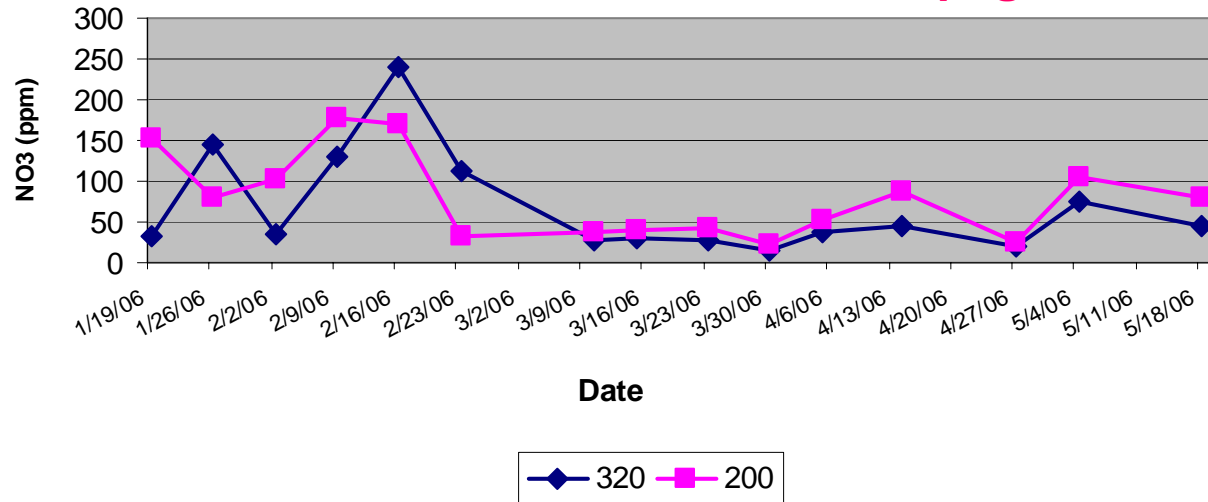
**Farm # 3
Seepage**



Soil Solution

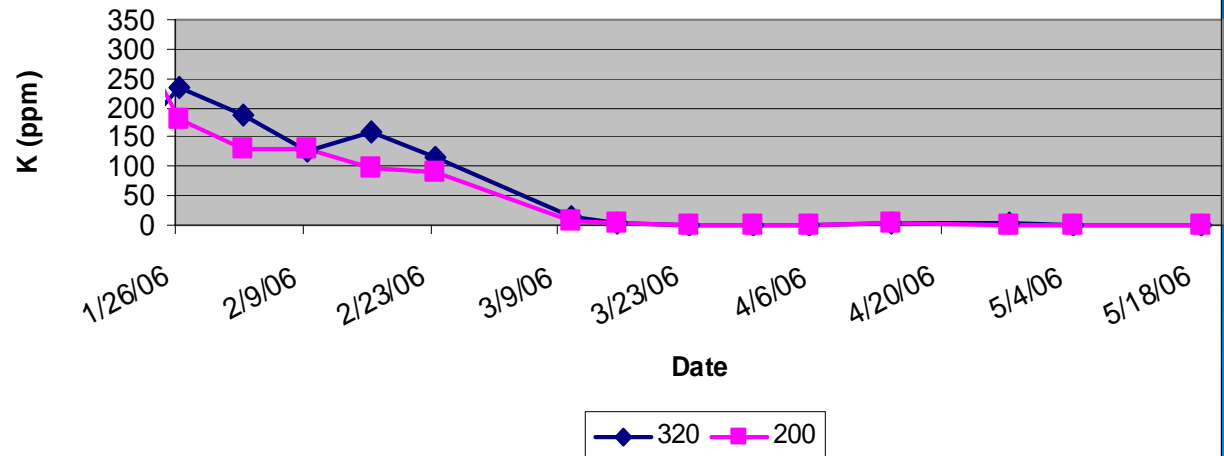
Soil-solution-NO₃

**Farm # 3
Seepage**



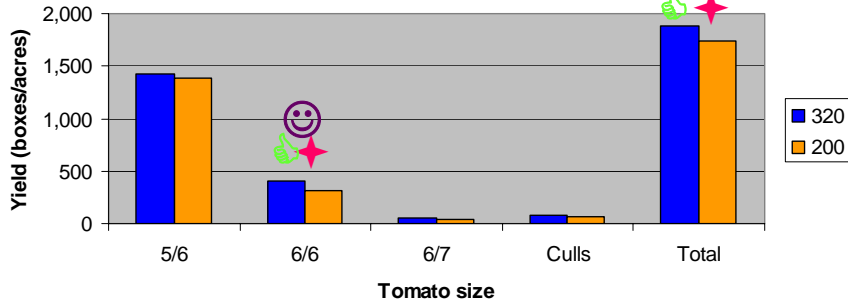
Soil Solution-K

**Farm # 3
Seepage**

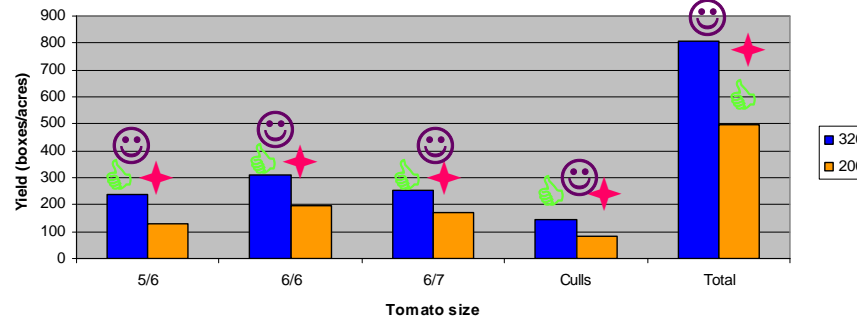


Harvests Farm #3

First Harvest (April 14, 2006)

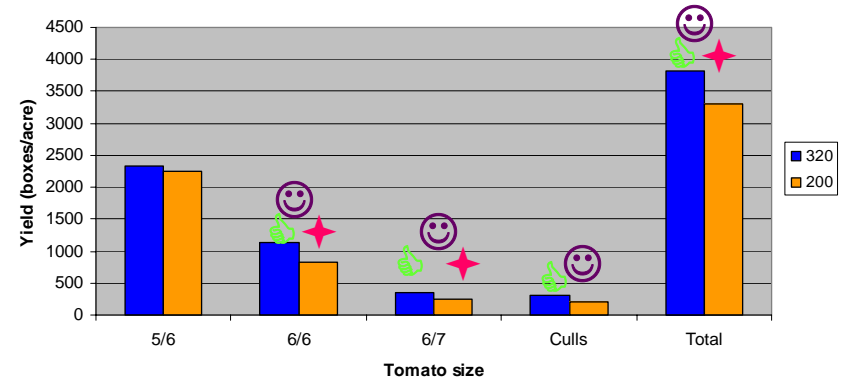


Third Harvest (May 18, 2006)



✦ 5% level of significance
 👍 10% level of significance
 😊 25% level of significance

Total Harvest







20



60



2 months
Farm # 4

120



160



240



300



320-G



360



420





3 months

Farm # 4

20

60

120

180

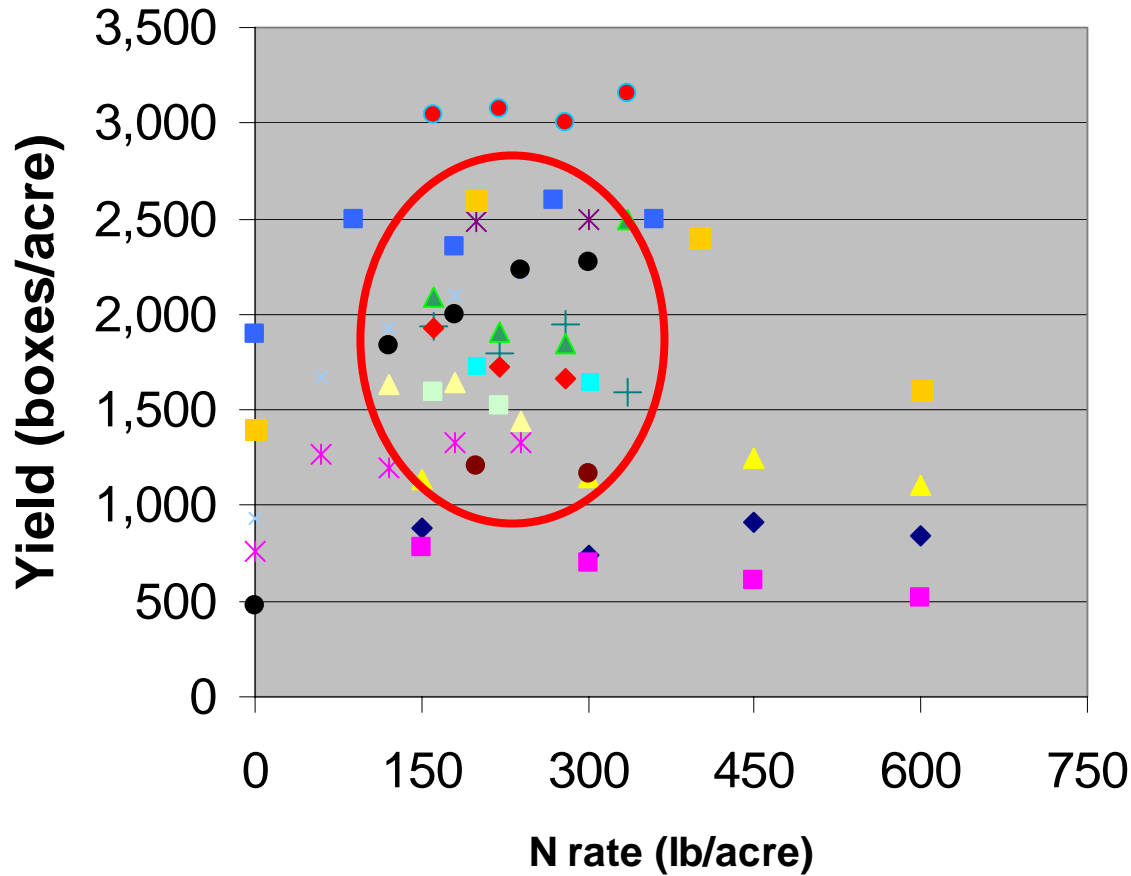
240

320

360

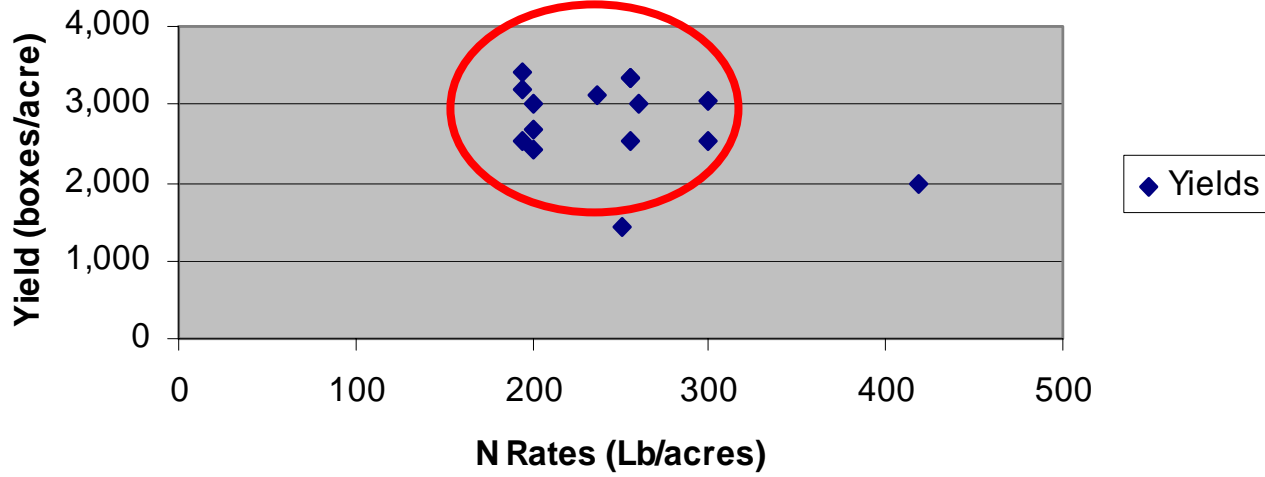
420

5/17/06

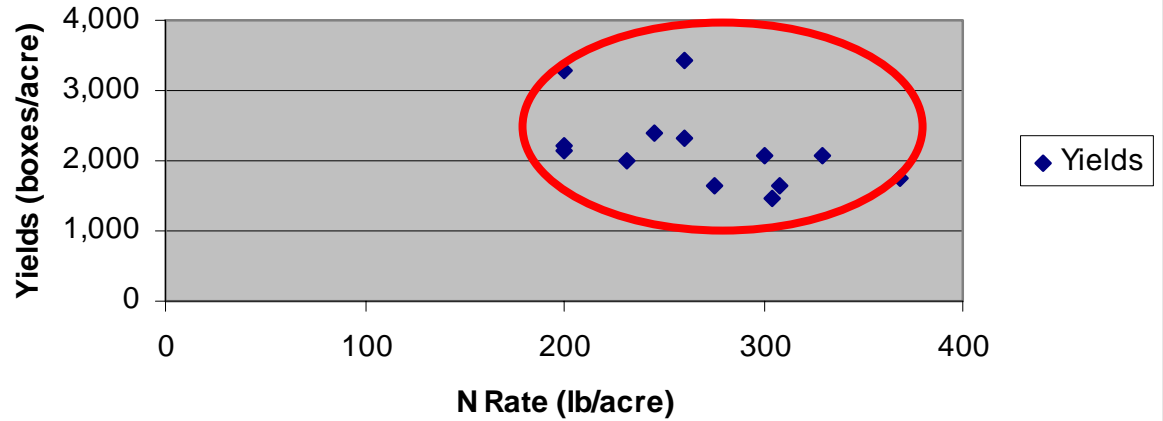


- ◆ Csizinszky et al., 1998
- Csizinszky et al., 1988
- ▲ Csizinszky et al., 1988
- Clark et al., 1989
- ✱ Clark et al., 1989
- Clark et al., 1989
- + Hochmuth et al., 1989
- ▲ Hochmuth et al., 1989
- Hochmuth et al., 1989
- ◆ Schuler et al., 1989
- Schuler et al., 1991
- ▲ Schuler et al., 1992
- ✱ Rhoads et al., 1996
- ✱ Rhoads et al., 1996
- Loscascio et al., 1996
- Rhoads et al., 1999
- Rhoads et al., 1999

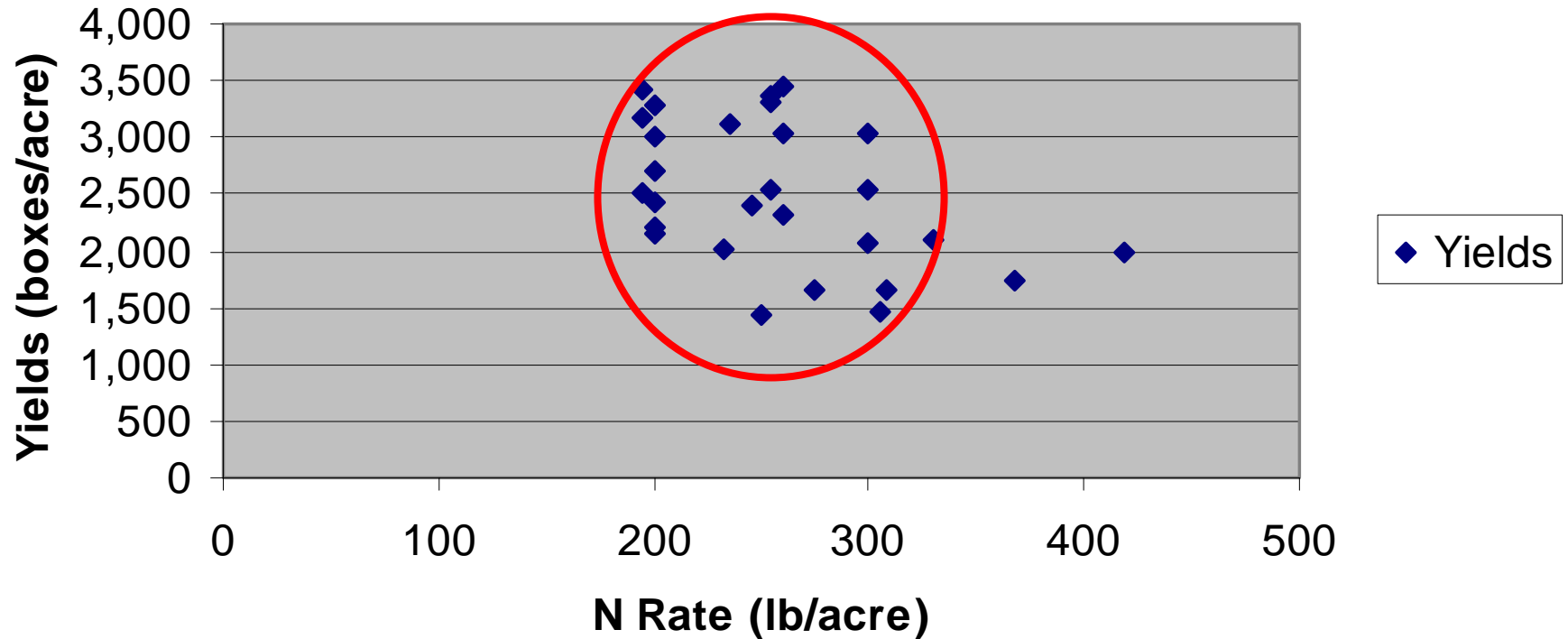
Tomato Yields Season 2004-05



Tomato Yields Season 2005-06



Tomato Yields Season 2004-06



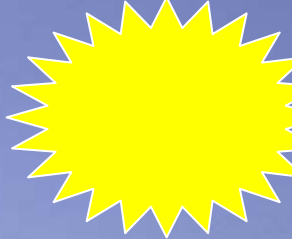
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200 lb/N





